Value of Transcranial Ultrasound Screening for the Preterm in the Neonatal ICU

Thesis

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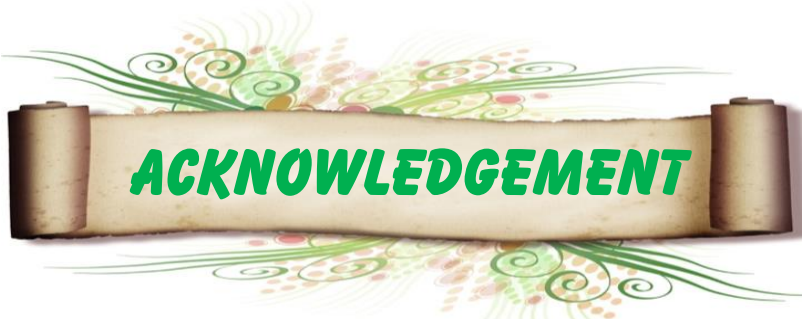

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List of Abbreviations

AT	Achilles Tendon
CC	Corpus callosum
Cho	Choline
Cr	Creatine
CSF	Cerebrospinal fluid
CUS	Cranial ultrasound
D\VM	Dandy-Walker malformation
DTI	Diffusion-tensor imaging
DWM	Dandy–Walker Malformation
ECMO	Extracorporeal membrane oxygenation
EDH	Epidural hemorrhage
FT	Fibertractography
GA	Gestational age
GM	Germinal matrix
GMH	Germinal matrix hemorrhage
HIE	Hypoxic-ischemic encephalopathy
ICH	Intracranial hemorrhage
ICU	Intensive care unit
IVH	Intra-ventricular hemorrhage
LVs	Lateral ventricle
MRS	Magnetic resonance spectroscopy
NAA	N-acetyl aspartate

PVL	Periventricular leukomalacia
SAH	Subarachnoid hematoma or hemorrhage
SDH	Subdural hematoma
US	Ultrasound
WM	White matter

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INTRODUCTION

It is well known that the number of surviving preterm infants is today steadily increasing ***(Fanaroff et al., 2007).***

Despite the improvements in perinatal medicine, brain injury is still a major clinical problem and remains a significant cause of perinatal morbidity and mortality ***(Volpe 2009).***

The final result is not only the great distress incurred by the newborn and later the child and adult, but also the considerable burden inflicted on both their families and the national health system ***(Iliodromiti et al., 2012).***

The importance of preterm screening by cranial ultrasound is sustained by the observation that in this vulnerable group, babies who are found to have abnormal brain scans are usually asymptomatic. Only occasionally these patients develop symptoms (seizures or other neurological symptoms) due to a massive intracranial hemorrhage (ICH) ***(Brezan et al., 2012).***

Cranial ultrasound is a safe imaging modality that does not require sedation and can be performed bedside. It can be repeated as often as necessary because of the lack of ionizing radiation ***(Orman et al., 2014).***

Germinal matrix hemorrhage (GMH) is a frequent finding in the neonatal period. It occurs primarily, but not exclusively, in PT neonates of very low birth weight ***(Horsch et al., 2010) .***

One of the major problems in preterm neonates is damage to white matter . This damage involves multifocal necrosis resulting in cystic periventricular leukomalacia (PVL) or a diffuse astrogliosis and loss of myeline-producing oligodendrocytes ***(Iliodromiti et al., 2012).***

PVL frequently exists together with intraventricular hemorrhages, this reflecting the vulnerability of the premyelinating oligodendrocytes ***(Back et al., 2005)*** .

Congenital brain anomalies are also could be seen during the cranial ultrasound screening, such as Dandy-Walker malformation (D\VM), Chiari malformation, agenesis of corpus callosum, Joubert syndrome and lissencephaly (smooth brain) ***(Orman et al., 2014)***.

AIM OF THE WORK

The primary aim of his study is to evaluate the usefulness of universal cranial ultrasound screening in preterm neonates in the neonatal intensive care unit (ICU) with gestational age between 28 and 37 weeks to detect the different intra cranial pathologies in this pediatric group

Secondary aim is to determine the number of preterms in the neonatal ICU with abnormal cranial ultrasound even if clinically silent.